CLAIMS

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1. An illumination system for a microlithographic projection exposure apparatus, comprising:

a) a light source for generating a projection light beam, and

b) a masking system for masking a reticle, said masking system including

i) adjustable first blades for masking in a first direction, wherein the first blades are arranged in or in close proximity to a first field plane, and

ii) adjustable second blades for masking in a second direction, wherein the second blades are arranged in or in close proximity of a second field plane which is different from the first field plane.

2. The illumination system of claim 1, further comprising:

a) a first objective, which images a first optical raster element on the first field plane6, and

b) a second objective, which is arranged behind the

first objective in a beam propagation direction and images the first field plane on the second field plane.

3. The illumination system of claim 2, further comprising:

a) a second optical raster element, which expands a transiting light beam exclusively in the first direction and which is arranged in the first objective, and

b) a third optical raster element which expands a transiting light beam exclusively in the second direction and which is arranged in the second objective.

4. The illumination system of claim 3, wherein the second optical raster element is arranged close to a pupil plane within the first objective, and wherein the third optical raster element is arranged close to a pupil plane of the second objective.

5. The illumination system of claim 1, wherein the first blades and the second blades define a substantially strip-shaped light field on the reticle, said light field having an extension in the first direction which is shorter than an extension in the second direction.

6. The illumination system of claim 1, further comprising an attenuation system for locally variable attenuation of the light intensity, wherein said attenuation system is arranged in the second field plane.

7. The illumination system of claim 2, wherein the first objective and the second objective are configured

so that a light field illuminated in the first field plane is smaller than a light field illuminated in the second field plane.

8. The illumination system of claim 2, further comprising a manipulator arranged in the second objective for manipulating a pupil of the second objective.

9. The illumination system of claim 2, wherein the first objective is a zoom-axicon objective having two axicon lenses which are adjustable relative to one another.

10. The illumination system of claim 2, further comprising a third objective which images the second field plane on a third field plane in which the reticle is arranged.

11. A microlithographic projection exposure apparatus for imaging structures contained in a movably arranged reticle on a light-sensitive layer, comprising a transmission filter having a locally varying transmissivity and being movable synchronously with movements of the reticle.

12. The apparatus of claim 11, further comprising:

a) an illumination system for generating a projection light beam, which illumination system contains a light source and an imaging optical system,

b) a first traversing system for moving the reticle in an image plane of the optical system,

c) a projection lens for imaging structures contained in the reticle on a light-sensitive layer,

d) a second traversing system for moving a support of the light-sensitive layer,

e) a third traversing system for moving the transmission filter into or close to a field plane of the optical system, wherein said field plane is optically conjugate to the image plane,

f) a control system for controlling the traversing systems such that the reticle, the support and the transmission filter move synchronously.

13. The apparatus of claim 11, wherein a one to one correspondence is provided between each point on the transmission filter and each point on the reticle.

14. The apparatus of claim 11, wherein the transmission filter has a transmissivity distribution over its surface which is configured such that, at least approximately, the same light energy per unit area impinges on each exposed point on the light-sensitive layer.

15. A method for homogenizing the light energy which impinges per unit area on a light-sensitive surface in a microlithographic projection exposure apparatus, wherein

the light-sensitive surface is configured to be arranged in an image plane of a projection lens of the projection exposure apparatus, said method comprising:

a) arrangement of a light-sensitive element in the image plane;

b) projection of a reticle on the light-sensitive element under the conditions under which microstructured components are to be manufactured using the reticle, in a scanning process in which the light-sensitive element is moved synchronously with the reticle;

c) locally-resolved determination of the light energy impinging on the light-sensitive element per unit area;

d) determination of the smallest value of light energy which has been detected in step b) for a point to be exposed on the light-sensitive element;

e) provision of a traversing system for moving a transmission filter having a locally varying transmissivity synchronously with traversing movements of the reticle;

f) determination of the local distribution of the transmissivity of the transmission filter such that, during a further projection in which the transmission filter is moved synchronously with the reticle,

the smallest value for the light energy impinging per unit area determined in step c) is at least approximately achieved at all points to be exposed on a light-sensitive layer arranged in the image plane.

16. The method of claim 15, wherein the light-sensitive element is a measuring sensor.

17. The method of claim 15, wherein the light-sensitive element is a light-sensitive photoresist.

18. An illumination system for a microlithographic projection exposure apparatus comprising:

a) a light source,

b) a first objective that has a first pupil plane and includes two axicon lenses which are configured to displace relative to each other,

c) a first optical raster element which is arranged in an object plane of the first objective,

d) a second objective arranged in the optical path behind first objective and imaging the first pupil plane onto a second pupil plane, and

e) a second optical raster element arranged in the second pupil plane.

19. The illumination system of claim 18, wherein the second objective has a magnification between approximately 0.5 and approximately 2.